$$a\sqrt{3}+r\cos\theta,\quad \frac{a\sqrt{3}}{4}+r\sin\theta,$$

where $PQ=r$, and the line PQ makes an angle θ with the x-axis. Hence, since Q lies on the curve, we have

$$2ar(\cos\theta+8\sin\theta)+\sqrt{3}\,ar^2\cos\theta(\cos\theta+8\sin\theta)+4r^3\cos^2\theta\sin\theta=0.$$

One value of r is zero for all values of θ; hence one branch of the curve passes through P. *Two* more values of r are zero, when $8\sin\theta+\cos\theta=0$. Hence P is a point of inflexion. In a similar manner we can show that the other points named are points of inflexion.

Also solved by **A. H. Holmes, J. Scheffer, and G. B. M. Zerr.**

PROBLEMS FOR SOLUTION.

ALGEBRA.

265. Proposed by G. W. GREENWOOD, M. A., McKendree College, Lebanon, Ill.

Obtain the reduced cubic $4\theta^3-I\theta+J=0$ of the biquadratic $ax^4+4bx^3+6cx^2+4dx+e=0$.

266. Proposed by L. E. NEWCOMB, Los Gatos, Calif.

Find the nth term and the sum of n terms of the series $1+3+7+17+\ldots\ldots$

267. Proposed by O. E. GLENN, Ph. D., Springfield, Mo.

Express the trigonometric functions of x as infinite continued fractions.

CALCULUS.

221. Proposed by Professor F. ANDEREGG, Oberlin College, Oberlin, Ohio.

If a, b, c, ... represent all the prime numbers 2, 3, 5, ... prove that

$$\left(1+\frac{1}{a^2}\right)\left(1+\frac{1}{b^2}\right)\left(1+\frac{1}{c^2}\right)\ldots\ldots=\frac{15}{\pi^2}.$$

222. Proposed by REV. R. D. CARMICHAEL, Hartselle, Ala.

Evaluate $\int_0^1 (1+x^m)^n \log x\, dx$.

DIOPHANTINE ANALYSIS.

137. Proposed by REV. R. D. CARMICHAEL, Hartselle, Ala.

Prove that all multiply perfect numbers of multiplicity $\varkappa$ having only n distinct primes are comprised in $n=2, 3, 4$.